

2004-554612/54	A14 B07 D21 F06 G02 (A82 A96 A97 D18 F09)	BADI 2002.12.30 *DE 10261750-A1 2002.12.30 2002-1061750(+2002DE-1061750) (2004.07.15) C08F 220/52, A61K 7/00, C08F 226/00, A61K 7/11 New ampholytic copolymers of unsaturated anionic, cationic and amide monomers, especially useful in cosmetic or pharmaceutical compositions, e.g. as hair fixing or conditioning agents or in coatings C2004-203126	<p>A(4-D1, 10-B1, 12-V1, 12-V4) B(14-N17, 14-R2) D(7-B, 8-B2, 8-B3, 8-B4, 8-B5, 8-B9) F(3-E1, 5-A6B) G(2-A5) .2</p> <p>group(s) and amide(s) of formula $R^1\text{-CO-NR}^2R^3$ (III). One of R^1 - R^3 = $-C(R^4)=CH_2$ and the remainder = H, alkyl, cycloalkyl, heterocycloalkyl, aryl or heteroaryl; or $R^1 + R^2$ = group completing a 5-8 membered lactam; or NR^2R^3 = 5-7 membered heterocycle; R^4 = H or 1-4C alky. Provided that R^1 - R^3 together have not more than 8C.</p> <p>An INDEPENDENT CLAIM is included for new polyelectrolyte complexes (B), comprising at least one copolymer (A) and at least one other polyelectrolyte.</p> <p><u>NOVELTY</u> New ampholytic copolymers (A) are obtained by radical copolymerization of the following α,β-ethylenically unsaturated monomers: compound(s) (I) containing anionogenic and/or anionic group(s), compound(s) (II) containing cationogenic and/or cationic group(s) and amide(s) (III).</p> <p><u>DETAILED DESCRIPTION</u> New ampholytic copolymers (A) are obtained by radical copolymerization of the following α,β-ethylenically unsaturated monomers: compound(s) (I) containing anionogenic and/or anionic group(s), compound(s) (II) containing cationogenic and/or cationic</p> <p><u>USE</u> The use of (A) or (B) is claimed: (1) in hair cleansing, skin care or protection, nail care, decorative cosmetic or hair treatment compositions (especially hair fixing and/or conditioning compositions, particularly in the form of a hair gel, shampoo, fixing foam, lotion, spray or foam); (2) as a pharmaceutical auxiliary, especially as or in coatings for solid drug formulations;</p>
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(3) for modifying rheological properties;
(4) as surfactants; or
(5) as or in coatings in the textile, paper, printing and leather industries. Cosmetic or pharmaceutical compositions containing (A) or (B) are also claimed.

ADVANTAGE

(A) can provide a broad spectrum of beneficial actions when used as sole additive in compositions (especially cosmetic or pharmaceutical compositions), e.g. in forming non-sticky, smooth films or providing fixing or gelling action. (A) are compatible with most other polyelectrolytes.

ADMINISTRATION

Claimed pharmaceutical or cosmetic compositions containing (A) or (B) contain a carrier (specifically one or more of water, water-miscible organic solvents (preferably 1-4C alkanols), oils, fats, esters of 6-230C monocarboxylic acids with mono-, di- or trihydric alcohols, fatty acids and/or fatty alcohols); optionally contain one or more of cosmetic active agents, emulsifiers, surfactants, preservatives, perfume oils, thickeners, hair polymers, hair or skin conditioners, graft polymers, water-soluble or -dispersible silicone-containing polymers,

light protectants, bleaching agents, gel formers, care agents, colorants, toners, tanning agents, dyes, pigments, consistency modifiers, moisturizers, refatting agents, collagen, protein hydrolyzates, lipids, antioxidants, antifoams, antistatic agents, emollients and/or plasticizers; and are preferably in the form of a gel, foam, spray, ointment, cream, emulsion, suspension, lotion, milk or paste.

EXAMPLE

A copolymer (A') was prepared by solution polymerization using a monomer mixture (a) of 300 g vinyl pyrrolidone, 1200 g of 15% aqueous methacrylamide solution, 95 g diallyl dimethylammonium chloride, 42 g dimethylaminopropyl-methacrylamide and 21 g methacrylic acid, an initiator solution (b) of 6 g Wako V 50 (RTM; 2,2'-azobis-(2-aminopropane) dihydrochloride) in 123 g water and an initiator solution (c) of 4 g Wako V 50 (RTM) in 82 g water. A mixture of 166 g (a), 12.9 g (b) and 137 g water was heated to 65 °C under stirring. After the start of polymerization (shown by an increase in viscosity), the remainder of (a) was added over 3 hours and the remainder of (b) over 4 hours, the temperature being increased to 68 °C. The mixture was stirred for 2 hours at 70 °C, treated with (c) over 30 minutes at 70 °C, post-polymerized for 2 hours at 80 °C and

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treated with steam for 2 hours to give a 30% solution of (A'). The solution was stabilized by adding 100 ppm Euxyl K100 (RTM; 5-chloro-2-methyl-3(2H)-isothiazolone, 2-methyl-3(2H)-isothiazolone and benzyl alcohol. Powdered (A') could be obtained by spray-drying or lyophilization. A fluid hair gel comprising 5.3% (A') (30% aqueous solution), 25.0% Natrosol 250 L (RTM; hydroxyethyl cellulose; 2% aqueous solution), 25.0% C-Dry MD 1915 (RTM; degraded starch; 10% aqueous solution) and distilled water (plus preservative, soluble ethoxylated silicone and perfume as required) to 100% was prepared by prolonged homogenization at room temperature.

TECHNOLOGY FOCUS

Polymers - Preferred Anionic Monomers: (I) are monoethylenically unsaturated carboxylic, sulfonic and/or phosphonic acids, specifically (meth)acrylic, ethacrylic, α -chloroacrylic, crotonic, maleic, fumaric, itaconic, citraconic, mesaconic, glutaconic or aconitic acid, maleic anhydride or their mixtures, especially (meth)acrylic acid or a mixture containing (meth)acrylic acid.

Preferred Cationic Monomers: (II) are esters of unsaturated mono- or

dicarboxylic acids with aminoalcohols (or their N-alkyl or N,N-dialkyl derivatives); amides of unsaturated mono- or dicarboxylic acids with diamines having at least one primary or secondary amino group; N,N-dialylamine; N,N-diallyl-N-alkylamines or their derivatives; vinyl- or allyl-substituted N-heterocycles; or vinyl- or allyl-substituted heteroaromatic compounds. In particular (II) is one or more of N,N-dimethylaminoethyl (meth)acrylate, N,N-dimethylaminopropyl (meth)acrylate and vinyl-imidazole.

Preferred Amide Monomers: (III) are primary amides of unsaturated monocarboxylic acids, N-vinyl-amides of saturated monocarboxylic acids, N-vinyl-lactams or unsaturated monocarboxylic acid N-alkylamides or N,N-dialkylamides, especially one or more of (meth)acrylamide, N-vinyl-pyrrolidone, N-vinyl-caprolactam, N-vinyl-formamide and N-vinyl-acetamide.

Preferred Components: (A) optionally also contains units derived from further monomers (IV), selected from: esters of unsaturated mono- or dicarboxylic acids with 1-30C alkanols or alkanediols; amides of unsaturated mono- or dicarboxylic acids with 2-30C aminoalcohols containing primary or secondary amino groups; unsaturated

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monocarboxylic acid N-alkylamides or N,N-dialkylamides containing more than 8C in addition to the carbonyl C; vinyl or allyl esters of 1-30C monocarboxylic acids; vinyl ethers; vinyl aromatics; vinyl or vinylidene halides; 1-8C monoolefins; non-aromatic hydrocarbons with at least two conjugated double bonds; and/or siloxane macromonomers.

(A) are optionally obtained by polymerization in presence of one or more additives (V) selected from polyether compounds (specifically polyalkylene oxides and/or polyalkylene oxide-containing silicone derivatives), polymers having at least 50 wt. % vinyl alcohol repeating agents and/or cellulose or starch (or derivatives). (A) optionally also contains crosslinking units derived from monomer(s) (VII) having at least two double bonds.

Preferred Polymers: (A) is obtained by radical copolymerization of 0.1-25 wt. % (I), 0.1-40 wt. % (II), 40-99.8 wt. % (III), 0-10 wt. % (IV) and 0-10 wt. % (VI), optionally in presence of up to 25 wt. % (V). In particular (A) is obtained from 0.1-10 (or 5-20) wt. % (methacrylic acid as (I), 1-20 (or 10-30) wt. % N,N-dimethylaminopropyl (meth)acrylate and vinyl-imidazole as (II), 70-98.9 (or 50-85) wt. % (meth)acrylamide, N-vinyl-pyrrolidone, N-vinyl-caprolactam and/or N-vinyl-formamide as (III), optionally together with 0.05-1 wt. % (VI) and/or 1-10 wt. % ester(s) of an unsaturated mono- or dicarboxylic

acid with a 1-30C alkanols (preferably stearyl (meth)acrylate) as (VI) and optionally in presence of up to 10 wt. % (V). Preparation: (A) are prepared by conventional radical polymerization procedures, preferably solution or precipitation polymerization. (27pp2400DwgNo.0/0)

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